6.4 Alarms and Events

The Corridor Server stores all alarms and events that it receives from the Zone Controllers in the database. The Corridor Server immediately pushes the alarms/events to CMMS/MOMS via a URL post.

6.5 Time Synchronization

The Zone Controllers and Image Server synchronize their times with the Corridor Server on start-up.

6.6 Zone Controller Start Up

The Corridor Server stores the current versions of the Zone Controller software applications, transponder status list, and Zone Controller configuration files so they are available to the Zone Controller on start up.

6.7 Toll Rate Processing

The Corridor Server determines a corresponding toll rate table as provided by the dynamic pricing subsystem.

6.8 Dynamic Pricing

This section describes business rules for Dynamic Pricing Algorithm.

6.8.1 Toll Rate

When the ExpressLanes are in operation, the toll rate schedule will be a minimum of $0.10 per mile during off-peak hours and $0.35 per mile during peak hours. The base maximum toll rate per mile for the ExpressLanes will be $1.70. Toll rates will vary based on, traffic density (traffic volumes/travel speeds) and will automatically adjust using a dynamic pricing system. The trip price is determined by multiplying the miles travelled by the rate per mile in each tolling segment at the time of the trip. Metro will monitor toll rates against ExpressLanes performance and adjust the maximum rate per mile to maintain performance standards.

After four occurrences, within a quarter, of meeting the density threshold, staff may increase the maximum price per mile by $0.10.

Density threshold is defined as:

- Density exceeding 48 (calculated as traffic volume/average travel speed);
- Lasting more than 35 minutes; and
- Excludes incidents.

The minimum charge during peak hours is computed to be at least 150% of the transit rate in the ExpressLanes corridor. Toll rates will vary, in the increments of $0.05, based on traffic levels in the ExpressLanes to ensure a minimum 45 mph travel speed and shall vary within the ranged defined here. The toll minimum or maximum toll rate can be adjusted at the direction of Metro.

The Traffic Management Operators may manually override the calculated toll rate at the direction of Metro, within the minimum and maximum range provided by Metro.

In the event of a dynamic pricing system failure, toll rates based on an historical time of day pricing schedule will be displayed on the DMS and accordingly charged to the customer. As the unavailability of dynamic pricing prevents real time traffic speeds from being monitored, a time of day schedule will be applied indefinitely,

6.8.1   Segment Mileage

The following table represents the mileage of each segment on the ExpressLanes.

Table 6-1 Segment Mileage

Facility/Segment	Start Point	End Point	Trip Length
I-10 EB-1	Entrance at Alameda Street	Midway point of ingress/egress at Atlantic Blvd	5.55
I-10 EB-2	Midway point of ingress/egress at Atlantic Blvd	End of Del Mar exit ramp at Del Mar Avenue	2.8
I-10 EB-3	Point where the Del Mar Ave exit ramp intersects with I-10 EB ExpressLanes, plus the additional length of the Del Mar Ave exit ramp	Midway point of ingress/egress at Baldwin Avenue	1.75
I-10 EB-4	Midway point of ingress/egress at Baldwin Avenue	End of double line	3
I-10 EB Total	Entrance at Alameda Street	End of double line	13.1
I-10 WB-1	Beginning of double line following ingress at Temple City Blvd	Midway point of ingress/egress at Fremont Avenue	5.75
I-10 WB-2	Beginning of entrance ramp at SB right turn from Del Mar Avenue	Midway point of ingress/egress at Fremont Avenue	2.9
I-10 WB-3	Midway point of ingress/egress at Fremont Avenue	Exit to I-10 GP lanes at I-710	0.9
I-10 WB-4	Midway point of ingress/egress at Fremont Avenue	Exit to Rte 101 GP lanes (before bus station)	3.85
I-10 WB-5	Exit to Rte 101 GP lanes (before bus station)	Alameda Street	1.5
I-10 WB-Total	Beginning of double line following ingress at Temple City Blvd	Alameda Street	11.1
I-110 NB-1	Entrance at 182nd Street at Artesia Transit Center	Midway point of ingress/egress at Redondo Beach Blvd	1.85

I-110 NB-2	Midway point of ingress/egress at Redondo Beach Blvd	Midway point of ingress/egress at I-105 exit	1.55
I-110 NB-S	Midway point of ingress/egress at I-105 exit	Join point of I-105 EB/WB ramps with I-110 NB ExpressLanes, less the distance of the WB I-105 ramp.	0.95
I-110 NB-3	Join point of I-105 EB/WB ramps with I-110 NB ExpressLanes, less the distance of the WB I-105 ramp.	Midway point of ingress/egress at Manchester/Gage Avenue	3
I-110 NB-4	Midway point of ingress/egress at Manchester/Gage Avenue	End of 39th Street exit ramp at 39th Street	2.9
I-110 NB-5	Point where 39th Street exit ramp intersects with I-110 NB ExpressLanes, plus the additional length of the 39th Street ramp	Adams Blvd	1
I-110 NB Total	Entrance at 182nd Street at Artesia Transit Center	Adams Blvd	11.25
I-110 SB-1	Beginning of Flower Street SB on-ramp	Midway point of ingress/egress at 37th Street	0.4
I-110 SB-2	Midway point of ingress/egress at 37th Street	Midway point of ingress/egress at Manchester Avenue	3.25
I-110 SB-3	Beginning of 39th Street entrance ramp at 39th Street	Midway point of ingress/egress at Manchester Avenue	2.75
I-110 SB-4	Midway point of ingress/egress at Manchester Avenue	Midway point of ingress/egress at Century Blvd	1.45
I-110 SB-5	Midway point of ingress/egress at Century Blvd	Midway point of ingress/egress at El Segundo Blvd	2.6
I-110 SB-6	Midway point of ingress/egress at El Segundo Blvd	Entrance at 182nd Street at Artesia Transit Center	3.35
I-110 SB-Total	Beginning of Flower Street SB on-ramp	Entrance at 182nd Street at Artesia Transit Center	11.05

6.8.2   Trip Charge

Trips along ExpressLanes are composed of one or several toll segments; a toll segment is defined as the travel distance between two access (entry/exit) points. The mileage per toll segment is multiplied by the toll rate for each segment to determine a toll charge for each individual segment. The toll charge for the individual segments are combined to form the trip charge.

If a vehicle or transponder associated with the same account has a trip in the same direction within 60 seconds of one another, only one trip will post to avoid duplicate postings to the same account.

If a customer travelling in the same direction on the ExpressLanes has a transponder read missing at any given toll segment, the system will assess if the transponder readings at the following gantry is within a reasonable travel time window (see Table 6-2) and accordingly construct the entire travel trip as one single trip. However, within the same time window, if there is a transaction in the opposite direction on ExpressLanes the system will construct two separate trips for segments before and after the missing tolling point.

A skip segment is defined as a location where an intermediary entry or exit points exist within a toll segment. If a customer enters or exits within a skip segment, the toll segment price will be calculated at the shortest possible travel distance to ensure that the customer is not overcharged.

As a vehicle passes through its first toll segment, the toll rate at each toll segment in the direction of travel is locked to ensure the customer is charged the toll in effect at the start of their trip. To ensure that the customer is charged the price displayed on the DMS, the system evaluates three trip charges before assessing a toll: the trip charge at the time of the first read, the trip charge prior to the first read and the trip charge after the first read. The system chooses the lowest trip charge of the three possible charges for posting to the customer account.

If a trip includes segments with mixed occupancy settings, the trip will be charged at the lowest occupancy setting. For example, the first segment recorded the occupancy at SOV and the remaining segments recorded at HOV2. The trip will be charged at the SOV rate.

If a toll segment has two tolling points (gantries) within the same segment, the second tolling point will be included in the trip at a $0 value. The first tolling point represents the entire segment length, while the second tolling point represents a shorter segment length. There are three gantries (ST03, ET03 and WT03) which register $0 toll value when a tag is read and a tag or image is captured at the corresponding longer segment.

Table 6-2 Time Parameters

Start Plaza	End Plaza	Travel Time	Grace Time	Start Zone	End Zone	Travel Time (minutes)
NT01	NT02	0:05:00	0:01:00	101	102	10:00
NT02	NT03	0:08:00	0:00:00	102	103	16:00
NT03	NT04	0:10:00	0:00:00	103	104	20:00
NT04	NT05	0:08:00	0:00:00	104	106	20:00
ST01	ST02	0:04:00	0:00:00	107	108	7:00
ST02	ST03	0:05:00	0:00:00	108	109	9:00
ST03	ST04	0:05:00	0:00:00	109	110	9:00
ST04	ST05	0:05:00	0:00:00	110	111	9:00
ST05	ST06	0:08:00	0:00:00	111	112	12:00
ET01	ET02	0:12:00	0:00:00	113	114	18:00
ET02	ET03	0:08:00	0:00:00	114	115	12:00
ET03	ET04	0:10:00	0:00:00	115	116	18:00
WT01	WT02	0:10:00	0:00:00	117	118	12:00

WT02	WT03	0:06:00	0:00:00	118	119	12:00
WT03	WT04	0:08:00	0:00:00	119	120	15:00
WT04	WT05	0:04:00	0:00:00	120	121	12:00
WT05	WT06	0:10:00	0:00:00	121	122	18:00

6.8.3   Motorcycle Exclusion

Motorcycles will not be required to have a transponder when traveling on the ExpressLanes. For customers that have an account and a license plate that falls within the standard California motorcycle sequence (XXNXXXX), the toll will be posted to the account as an ITOL transaction at a $0.00 toll rate. Customers that do not have an ExpressLanes account and have a license plate that falls within the standard California motorcycle sequence will not receive a violation. The standard sequence has been entered into the exclusion table and will prevent notice creation for these transactions.
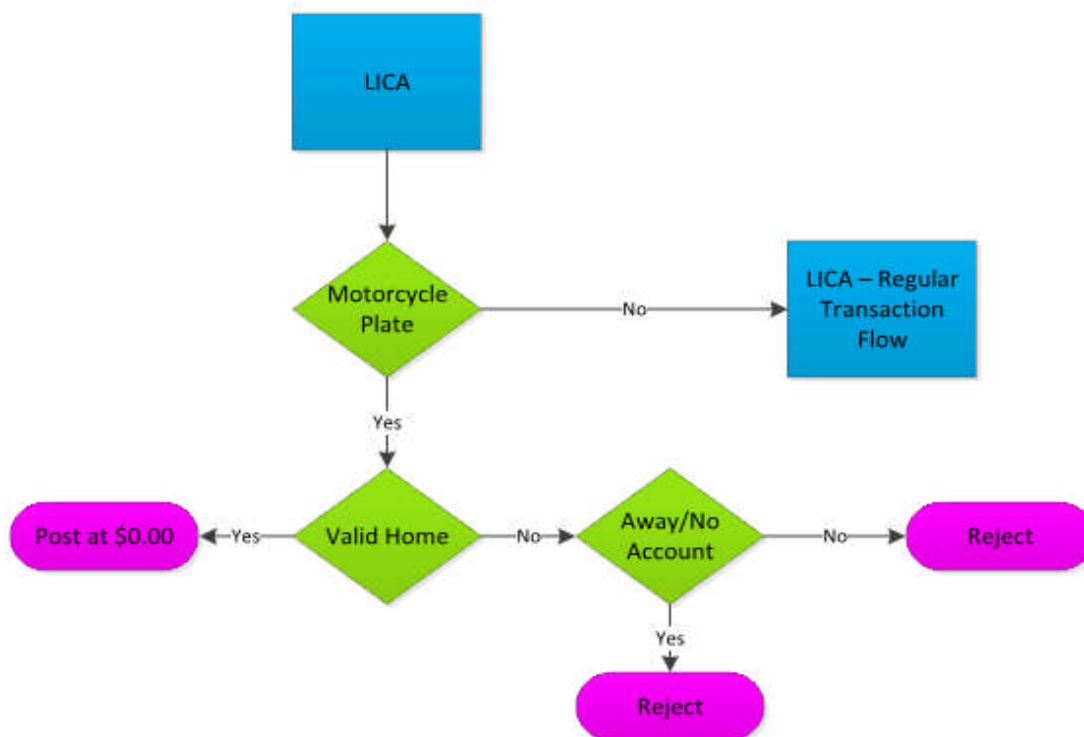

Figure 6-1: Motorcycle Exclusion

Motorcycle license plates that do not fall within the standard sequence will be required to register with the Metro ExpressLanes CSC. The ExpressLanes staff will enter the personalized motorcycle plates or alternative sequence in the exclusion table to prevent violation creation and ITOL transactions from posting to a home account.

6.8.4   Peak Hours for Toll Rates

The following are the peak and non-peak hours for tolling operations.

Peak hours of operations: Monday – Friday - 5 a.m. – 9 a.m.; 4 p.m. – 7 p.m.

Non-Peak hours of operations: Monday – Friday – 9 a.m. – 4 p.m.; 7 p.m. – 5 a.m. and all day Saturday, Sunday, and holidays designated by Metro.

6.8.5   Occupancy and Toll Assessment Rules

- Occupancy and Toll Assessment Rules for I-110:
    - SOV Vehicle - Peak: Pay Toll; Non-Peak: Pay Toll
    - HOV 2 Vehicles- Peak: No Toll; Non-Peak: No Toll
    - HOV 3+ Vehicles - Peak: No Toll; Non-Peak: NoToll

- Occupancy and Toll Assessment Rules for I-10:
    - SOV Vehicles - Peak: Pay Toll; Non-Peak: Pay Toll
    - HOV 2 Vehicles- Peak: Pay Toll; Non-Peak: No Toll
    - HOV 3+ Vehicles - Peak: No Toll; Non-Peak: No Toll

- Toll Assessment Rules in HOV-Only Operations – Upon declaration by Dynamic Pricing Algorithm of an HOV-only operational mode for ExpressLanes, DMS signs will depict HOV ONLY access state for corresponding entry points. Under this scenario, any single occupancy vehicles or ineligible high occupancy vehicles (HOV 2 on I-10 during peak periods) entering the ExpressLanes corridor after declaration of HOV ONLY operational mode will be charged as per the following rules:-
    - I-110 – Patron will be charged at the maximum toll rate of $1.80 per mile for the entire length of I-110 ExpressLanes corridor, in the direction of travel, irrespective of entry and exit of that particular patron trip. The maximum toll rates are described in the table below.
    - I-10 - Patron will be charged at the maximum toll rate of $1.80 per mile for the entire length of I-10 ExpressLanes corridor, in the direction of travel, irrespective of entry and exit of that particular patron trip. The maximum toll rates are described in the table below.

Effective April 10, 2017

Corridor	Max Toll Payable
I-110 NB	$ 20.25
I-110 SB	$ 19.90
I-10 WB	$ 20.00
I-10 EB	$ 23.60

6.8.6   Incidents and Toll Assessment Rules

This section defines business rules for toll assessment policies in case of incidents in Express Lanes corridors. The ExpressLanes system has been designed with a goal of providing a minimum of 45 miles per hour level of service for the ExpressLanes customers. Incidents along the ExpressLanes can have a detrimental effect on the level of service. This section describes steps to ensure effective customer service by addressing incident impact on ExpressLanes customers.

Due to an incident event in ExpressLanes corridor, the toll amount assessed on any customer account can be reversed by one of the following ways:

- Metro-Approved Reversals – On a bi-weekly basis, Xerox provides Metro with a list of incidents occurring on the ExpressLanes where speeds dropped below 45 MPH. Upon approval by Metro, Xerox will immediately reverse all ETC Home Customer transactions. Following Trip Construction (approximately ten days later), Xerox reverses Pay-by-Plate transactions that are not CTOC, non-revenue, or violator accounts. A summary of transactions reversed will be maintained on file and appended to the TMO Incident Log.

- Customer requested reversals are applied by the ExpressLanes Customer Service Representative (CSR) upon request from the customer and determination of a less than desirable level of service for the subject trip. Upon receiving a request from the customer, the CSR will have the ability to check the trip master record for the customer that shows the corridor average speed for the duration of the subject trip. If the average corridor speed is found to be less than 45 mph, the CSR will apply toll reversal to the customer's account, at the customer's request, as a one-time courtesy event, every 12 months.

6.9 Dynamic Message Sign

Under normal operations the Dynamic Message Sign (DMS) displays two prices and the minimum HOV required for toll free travel: one from entry to the next major exit and the second from entry to the end of the corridor.

The sign display is as follows:

I-110

Next Major Location: Price

Last Exit Location: Price

HOV2+0 w/FASTRAK